Mr. Edmund Hally's *Obſervations, concerning the ſame Occultation of* Mars *by the Moon, made at* Oxford, *Anno* 1676. Aug. 21. *P.M.*

Temp. Corr. h. ' "		' "
11.43.30	*He center of* Mars *from the Neareſt limb of the Moon,* ——	719½=12.40
11.49. 2	*Again,* ——	571=10. 3
11.54.58	*Again,* ——	409= 7.12
12. 3.25	*The center of Mars from the North Cuſp of* ☽,	1118=19.41
12.10.28	*The gibbous part of Mars touched the Moons limb.*	
12.10.42	*Mars was wholly covered, being diſtant from the Cuſp,* ——	963=17.14
12.40.00	At this time a *Halo* encompaſſed the Moon, in whoſe Circumference was *Saturn*, the *Pleiades*, *Capella*, and the following of the foot of *Perſeus.*	
13.10.41	*Mars did emerge, I ſuppoſe, his Center.*	
13.12.45	*Mars was diſtant from the Northern horn of* ☽,	1018=17.55
13.31.10	*Mars paſſed over a point noted in the Teleſcope.*	
13.33.15	*The Southern limb of* Ætna *paſſed by the ſame point.*	
13.34.00	*The lucid limb paſſed over the ſame point.*	
13.52.35	*The Moons diam. obſerved,* 1698=30'.1". *alt.* ☽ 31°. *circ.*	
13.57.52	*Mars from the Northern horn of the Moon,*	2042=36. 5
14. 2.53	*Mars from the Southern horn of the Moon.*	2266=40. 3

Having carefully conſidered the Moons Parallaxes in the obſervations of this Occultation at *Dantzick* and *Greenwich*, I find from the *Immerſion* the difference of Meridians between *Greenwich* and *Oxford* 4'.57"; between *Greenwich* and *Dantzick* 1^{h}. 14'. 50": By the *Emerſion* the firſt of thoſe differences is found 4'. 59", the latter 1^{h}.14'.41": which near agreement ſhews the Exactneſs of all the Obſervations.

Two Letters written by Mr. John Beaumont *Junior of* Stony-Eaſton *in* Somerſet-ſhire, *concerning Rock-Plants and their growth.*

SIR, *The Firſt Letter of* April 7. 1676.

I Lately peruſed the greateſt part of the Philoſophical Transactions; in which I received ſo great a ſatisfaction, that I reſolved to gratifie your generous Communications (if I may call it a gratuity) with ſome of the neweſt occurrents I have met with in Nature, which, if as kindly accepted, as freely ſent you, I ſhall readily do the like for the future as far as my ability and obſervations will help me out.

What I here preſent you, is concerning *Mineral* ſubſtances; for, having liv'd ſome years on *Mendip-hills* in *Somerſet-ſhire*, and reſiding at preſent but a mile on the North-ſide of them, I have had an opportunity to make ſome Obſervations in Mines. I find in ſeveral of the *Tranſactions* a mention made of Minerals, but what I ſhall here inſiſt on, relates chiefly to what I find *N.*100.*p.*6181; where is a deſcription of certain Stones figur'd like Plants, and by ſome obſerving men (as you ſay) eſteem'd to be Plants petrified, communicated by Mr. *Liſter*; whoſe deſcriptions I ſhall confirm and inlarge according to my Obſervations here; being very joyful, that ſo good a hand has foreſtall'd a good part of that little news which I might otherwiſe have ſent you concerning theſe Mineral productions.

1. All the *Trochitæ* and *Entrochi* deſcribed with their figures by Mr. *Liſter*, are found on thoſe Hills; I having had the ſeveral ſpecies by me theſe many years, except that figur'd like a fruit. And as to the length of the *Entrochi*, the thinneſs and thickneſs of their joynts, the ſmoothneſs of ſome in their outward circle, the ridges and knots of others, the branches, the degrees of greatneſs and ſmallneſs of the *Trochitæ* and the like, my obſervations generally concur with his; and ſo concerning their accidental Injuries. I have that ſpecies of *Entrochi*, which is tapering at both ends, and ſwells in the middle; and I find even the joynts of ſome are of that make; ſo that an *Entrochos* ſhews like a parcel of little barrels, ſet one on the other. I have likewiſe his *Summitates* or *faſtigia*, being long and ſlender pieces with a little button on the top; but more of theſe in their due place.

2. As to their *Hollows*, I find them of all bigneſſes, from a central point to the taking up of more than a third part of the Stone; ſome of the *Entrochi* are ſo hollow, that there is only a thin ſhell left, ſmooth within and without: Others have only a thin ſhell left, but with ſcrews within and without; and ſometimes both theſe are one entire piece with ſeeming ſutures. The *hollows* are generally round according to Mr. *Liſter*'s deſcription; though I have alſo many ſingle joynts and *Entrochi*, whoſe hollows are like a cinquefoil; and though this bore be moſt ſurprizing (as he ſays) yet, methinks, 'tis moſt natural to the *radix*, which has five hollow ſtirts or feet iſſuing ſide-ways from it according to the figure: And I find in ſome pieces of *radix's*,

which I have by me, that a little furrow paſſes inwardly from each foot to the top of the ſtone, with a ridge on the outſide of it. Beſides theſe I have a new ſpecies of *Trochites* and *Entrochi*, which has ſix inlets in the hollow, as the latter has but five; but with this difference, that theſe Inlets terminate in Angles, ſo that its a ſexangular hollow, whereas the cinquefoil-inlets are round as the leaf is, and not pointed, though I have ſeen even of theſe with ſharp angles.

3. Concerning the *Rays*, or ridges, and furrows; the joynts and ſockets by which the *Entrochi* are joyn'd together, I find a great variety in them; for, as ſeveral rays, ſhooting from a center, muſt of neceſſity leave conſiderable wideneſſes betwixt them, as they paſs towards the circumference, according to the bigneſs thereof; ſo, to fill up thoſe wideneſſes, I find, that in ſome, betwixt two rays, iſſuing from the center, a third ray riſes about half way on the ſtone from the center, and ſhoots to the circumference; ſome have their rays gently widening from the center to the circumference: Some have a trunk riſing from the cente, which grows forked towards the circumference: ſometimes betwixt thoſe forks there riſes a little ray near the trunk where the forks joyn, which ſhoots to the circumference; (but note, that theſe differences are ſcarce diſcernable where the rays are fine, but with the help of a Glaſs;) ſome again are ramous, having a trunk riſing from the center, with three, four, or five branches ſhooting to the circumference: Some are ſmooth half way on the ſtone from the centre, and have a circle of ſmall rays near the circumference: Some are ſmooth without any rays; theſe are commonly pretty thick, and are joyned in an *Entrochos* after this manner: one *Trochite* a little within the outward circle in the upper and lower parts where the rays uſe to be, has round inlets or ſockets, pretty deep, ſo that only a thin *Tympanum* hinders, but the *Trochite* would be hollow at this wideneſs all through; and in the middle of this *Tympanum* there is a hole, as in other *Trochites*, which is ſometimes round, ſome times like a cinquefoil: The *Trochites*, that anſwer this, on both ſides have ſmooth joynts (I cannot properly call them *ſcrews*, having no ridges) which enter into theſe ſockets; thoſe joynts being hollow alſo, and ſo other *Trochites* with ſockets come on upon thoſe again to make up the *Entrochos*. Some of theſe have both ſockets and rays; ſome have a ſocket on the

one ſide, and rays on the other without a ſocket; ſome are all ſmooth, only a ſmall ridge runs round them a little within the outward circle, which enters into a ſmall furrow anſwering to it; ſome are all ſmooth, and joyn'd only *per harmoniam*, as Mr. *Liſter* calls it; ſome *Trochites* hold of an equal thickneſs of ſubſtance from the center to the circumference; ſome are pretty thick in the circumference, and grow thinner towards the center; ſo that they have concavities on both ſides, to which convexities in other *Trochites* anſwer: Some hold of an equal thickneſs half way on the ſtone from the outward circle, and then grow concave to the center. Mr. *Liſter* mentions one *Trochite* he found of an oval figure, the rays ſcarce apparent, and a very ſmall point in the place of the pith: I have of this ſpecies with *Entrochi* of the ſame (if theſe, having loſt the figure, may retain the name of τρόχος;) ſome of theſe have good large holes in the middle, like other *Trochites*; but their bore is oval according to the ſtone. I have many other *Trochites* of this kind, but with this difference, that theſe have no rays, but are joyn'd together only by one ridge which paſſes directly along the middle of the ſtone the long way, there being a furrow in the other anſwering to it; theſe have alſo a ſmall peck in the middle making but very little impreſſion in the ſtone, and ſeldom paſſing through it, though I have of this ſort with indifferent holes as the other *Trochites*, but ſuch are commonly pointed at the ends, and not carried out with an oval round as the others. There are ſome ſingle joynts which are ſhap'd with a double oval, that is, the oval in the upper part of them ſtands clean contrary to the oval in their lower part: In ſome again the ovals do not ſtand ſo extreamly oppoſite to each other, but only the oval in the upper part of the *Trochite* ſeems a little wreſted from the direct line of the oval in the lower part, ſo that they ſtand bend-ways to each other, like a St. *Andrews Croſs*; and there are *Entrochi* made up after this manner; and I find moſt of the oval *Entrochi* grow crooked and twiſting. There are of theſe oval kinds of all degrees of thickneſs and thinneſs in their joynts, as are found in the round ones, and ſo for the bigneſs of their circumference, their ſmoothneſs in their outward circle, and their roughneſs with ridges, knots and branches, the length of the *Entrochi*, their Injuries, &c.

4. I come now to the *Radix*'s, of which I have one as perfect

as moſt that are to be got, and ſeveral broken pieces of others. That which is perfect, is about the bigneſs of a Wallnut, anſwering to Mr. *Liſters*, but without any impreſſion of a *Trochite* on it; the top of it indeed is a little flat with a hole in it, but it is withal very ſmooth, without the leaſt ſign of a ray. *Agricola* compares theſe ſtones to a Wheel; and truly the body of it well reſembles the Nave of a Cart or Coach, the ſhape of it being conical towards one end till you come juſt to the top, where it is a little flat (as I ſaid) with a hole in it; and it has another hole in the middle of the broad end juſt oppoſite to this, very fit for an *Axis* to paſs through; and the five hollow ſtirts or feet, iſſuing ſide-ways at equal diſtances from the broad bottom, ſomewhat reſemble Spokes; the ſaid ſtirts ſtanding about half an inch out from the body of the ſtone, ſo that it may not very improperly be call'd *Modiolus quinque-radiatus*; and at the ends of the ſtirts, where the hollows ſhould ſhew themſelves, there grows after a very artificial manner a pretty large ſeam of the ſame ſtone juſt over the middle of the hollow, from the upper part of the ſtirt to the lower part of it, parting the hollow in the middle, and covering about a third part of it; not that this ſeam enters farther into the hollow than the mouth of it; ſo that the hollow of each ſtirt preſents it ſelf with two eyes: Hence it appears, that thoſe ſtirts or feet were never longer than they are, and that no ſtone ever grew to them; and I think it hard to get one of theſe ſtones ſo perfect as that I have, it being very difficult for a Miner to ſave theſe fore-ſeams, they being very obnoxious to the leaſt injury. Mr. *Liſter* ſays, the feet were like Creſcents at the end, whereby I find the fore-ſeams of his Stones were broken off, as two of them are in mine. The ſtone ſeems wrought all over like the Fiſh mentioned by Mr. *Liſter*, being compos'd of Trigonal, Tetragonal, Pentagonal and Hexagonal Plates. The upper part of the Conical end is wrought round with ſix large Hexagonal plates, and theſe reach half way the ſtone; then follows a ſecond round, made up of eleven Pentagonal plates, pretty large, and theſe reach almoſt to the broad bottom, which is a little convex; the bottom it ſelf and feet contain Plates of all makes, but moſt of them are very ſmall. This Stone is in ſubſtance a whitiſh opaque fluor, of the ſame nature with the *Trochites*; it has outwardly a ruſty coat, and is blewiſh within like ſome Sea-ſhells. When 'twas firſt found 'twas full of a ſort of aſhcolour'd-griſty Clay, which is the evident material cauſe of it,it being found in a bed of the ſame. I eaſily pickt out the Clay with a Needle, ſo that 'tis now all hollow; the ſhell-like and ſparry ſubſtance being ſcarce as thick as a Half-crown. I muſt own the knowledge of its being a *radix* to Mr. *Liſter*'s hint, though I have *Agricola* by me, but did not well mind him; and becauſe the perfect *radix* was ſmooth on the top, and many other pieces of *radix*'s which I have by me,they did not well indicate the thing, though upon a review I find one of them with ſmall rays there. I have a great many of the Tetragonal, Pentagonal and Hexagonal Plates, with concavities, convexities; thin, ſmooth,and indented edges; little round knots on the convex part,others being only ſcabrous, others ſmooth, as I find many large pieces of the *Radix*'s are. The ſides of ſome are very unequal; in ſhort,they agree in all things with Mr. *Liſter*'s deſcriptions. I have one ſexangular Plate very pretty, whoſe convex part has on it a ſtar conſiſting of ſix Emboſt rays, which ſhoot from the center directly to the middle part of the ſides betwixt the Angles,and betwixt every two rays there grows a little ſtud after a very elegant manner.

5. To give an account of the *place* of their birth (though hinted before) I may now ſay this; I find the *Trochites* ſticking to rake-mold ſtones, and in the crannies of Rocks at all depths, from the graſs to 20 fathom; and doubtleſs there are of them deeper: But I find them moſt plenteouſly in certain beds of an aſhcolour'd-griſty Clay, and particularly at one place within a yard or two of the graſs. I found here a fruit with them like a *lapis Judaicus*(though ſomewhat defac'd)if not a ſpecies thereof; its about the bigneſs of an Acorn, with ridges and furrows running the long way; it differs from thoſe deſcrib'd by Mr. *Liſter* N. 110; *firſt*,that this is not bigger,but rather leſs in the middle than at the ends; and *ſecondly*, that its ridges are not knotted or purl'd. It is in ſubſtance a whitiſh opaque ſpar like the *Trochites*, though (as Mr. *Liſter* ſays) ſome *Trochites* are of a dark-colour'd ſpar;and I find ſome of a white cawky ſubſtance, and ſome have a tincture of red; but theſe differences proceed from the Clay of which they are made; for,though an aſhcolour be the chief in it,yet there are ſome veins of red in it, ſome of white, ſome of a light-blew, ſome of a dark-blew &c; which cauſe theſe varieties in the ſtones. I find ſome *Trochites* and *En-*

trochi ſhap'd in raw Clay before they have attain'd the conſiſtency of a Stone; and theſe, if laid in the Sun, become light and ſpungy like a *pumex*. I took up there a piece of another ſtrange Stone, of the like ſparry ſubſtance; 'tis about the bigneſs of a Wallnut, hollow, and fill'd with the ſaid Clay; it ſomewhat reſembles a Helmet; the fore-part of it is ſmooth, the upper part, which has a large ridge in the middle, is all wrought with little rings, three at a place, encircled within each other. The Stone call'd *Cornu Ammonis*, ſhap'd like a Rams-horn, is very frequent in this clay; the largeſt I have is ſeven inches in length, four inches in compaſs at the broad end, and two and a half at the ſmall end; the top being broken off. Tracing its Original, I find ſome of the firſt buddings out of it about the bigneſs of a young Cocks-ſpur, and very much like it. I have ſome in raw clay, and one growing from a white Cawky ſtone. They generally become at laſt a whitiſh Spar, and ſome milk-white as ſome of the *Trochites* are: There are of all intermediate proportions betwixt theſe two, though very few of any bigneſs are to be found entire, but all broken and imperfect pieces: And I take the ſeeming *ſummitates* of Mr. *Liſter* to be only little eſſays of Nature towards the production of this Stone, the alliance being evidently nearer than betwixt them and the *Trochites*. The texture of theſe Stones is thus: Some have maſſy ſpar in their inſides, which takes up three parts of the Stone; then from the ſharp top there grow thin flat cells, or ſmall pipes of Spar, ſet edge-ways, one cloſe to the other, all round the Stone, which ſhoot towards the broad end, and appear outwardly like ſmall ridges or ſeams; and many of theſe pipes, running down thus after the ſtone, ſhew their hollows, ſome at one place of it, ſome at another, and ſome not till they come to the broad end: And this is the texture of the great Stone, which has rings alſo, though ſomewhat defac'd, running round it, tending likewiſe in their growth towards the broad end as in a Rams-horn. Moſt of the leſſer ſtones have very little maſſy ſpar within them, and ſome have none, but appear ſomewhat hollow at the broad end, with cells coming down inwardly from the top of the ſtone, reſembling thoſe in the flowers of Coral, which terminate its branches; and doubtleſs, if taken from their beds in a ſeaſonable time, would yield the like milky-juyce; for I find in the Cells of ſome broken pieces of theſe ſtones an evident concretion of ſuch a milky juyce. And I may here acquaint you,that I have a piece of branchy ſpar, which I found at a Mine on theſe Hills, growing like Coral,and terminated with buttons or flowers like it.I find very few of the leſſer *Cornua Ammonis*, whoſe Cells do any way appear or ſhew their hollows outwardly, as in the great ſtone, whoſe outward ſurface is wholly made up (as I ſaid) of thoſe cells, or thin flat pipes, ſet cloſe the one to the other, many of which ſhew their hollows at ſeveral places in the ſtone; whereas the cells in the ſmaller ones appear only inwardly, having one coat outwardly which covers them all, and this coat in ſome is ſmooth, in others it's all wrought with little rings like the Helmet-ſtone beforemention'd; and ſome outſides have ridges or rings round them as a Rams-horn.

6. The Stones, I have given you an account of,generally move in Vinegar, the juyce of Lemmons,&c. ſending forth bubbles, as I find Cawk will very freely, and moſt of our Mineral ſtones. *Baptiſta Porta* tells us, l.20.*Magiæ Naturalis*,that he ſaw a piece of *Alabaſter* weighing four pounds, and carved in the ſhape of a Tortoiſe,move ſo. The ſaid motion ſeems to proceed from the conteſt betwixt the acid ſpirit of the Vinegar and the Mineral ſalt; ſo that the Spirits by fermentation breaking forth under the Stone produce that effect.

I well know,that an accurate view would diſcover many nice diſtinctions (omitted by me) in the ſhapes of all theſe Stones, (our Mineral Salts being almoſt as buſie and luxuriant, as the volatile Salts in the Air in the figuration of Snow ;) which I judge would be beſt perform'd by that perſon who makes it his buſineſs to record theſe things in the Hiſtory of Nature, he being the moſt likely to find the apteſt terms to ſpecifie them ; and haply the beſt ſervice we can afford you from the Couutry, may be to furniſh you with the things themſelves,with a diligent account of the ſoyl and place of their birth, and with as full an intimation of their primary riſe as we can poſſibly arrive at by a cloſe inſpection; leaving the minute deſcription of the thing to the worthy Hiſtorian.

Should I give you my thoughts concerning their *Vegetation*, it would lead me beyond the bounds, which I am willing to allow this Letter, though I ſhall readily do it, and what other ſervice I may, if you pleaſe to command it. If I had had the conveniency of an Artiſt to help the failings of my pen with his de-ſign, haply theſe things might have been more acceptable to you, and to thoſe other worthy Perſons, who make it a part of their delight to behold theſe curious ſports of Nature, as they are repreſented by a skilful hand, when they cannot ſee them in themſelves; but I know your Candour will excuſe what could not be procur'd by him, that is very much, *Sir*,

Stony-Eaſton, Apr. 7. *Your humble Servant,*
1676. J. Beaumont *Jun.*

SIR, *The Second Letter of* June 17. 1676.

SInce my laſt having uſed ſome diligence in ſearching Mines, it has been my chance to make good the ſuſpicion of Mr. *Liſter*, to wit, that the *Trochites* are parts of Rock plants; for, viewing the Earths and Stones caſt up out of ſeveral Mines where thoſe ſtones were, I came at length to a Mine, where well near all the *Entrochi* (ſo called hitherto) or bodies of theſe plants grew tapering and ramous, ſome of them having branches iſſuing from them near two inches in length, and other ſmall branches iſſuing from thoſe; and upon a nearer ſearch I diſcover'd an Entire plant, though ſmall, growing up after the ſide of a Stone: I found alſo, that all the clifts in ſome Mines are made up of theſe Stone-plants; whereof ſome, as appears, were converted into the nature of thoſe Lime-ſtone-rocks, whilſt they were in their firſt tender growth; others being become *Spar* compoſe rocks of that ſubſtance.

Conſidering that all the Clifts for a very large circumference in ſome places are made up of theſe Plants, we may truly ſay, that there have been, and are, whole fields or forreſts of theſe in the Earth, as there are of Coral in the *Red-Sea*. In the Courſes, (or Loads, as ſome call them) betwixt the clifts I find of theſe Plants growing up in the griſty clay, mention'd in my laſt, being rooted on the rake-mold ſtones; many of them being above a foot in height, and about the bigneſs of the ſtem of a Tobacco-pipe: All I have yet ſeen of this length, are either raw clay, or of the conſiſtency of a Lime-ſtone, and ſome of them have outwardly evident beginnings of circles and ſutures. The ſmall Plant which is entire, and the branched bodies of many others have attain'd their full term of growth, being become perfect *Spar*: If theſe had ever a height anſwerable to their bigneſs, (ſome of them being near three inches about, they muſt have been much higher than thoſe before-mention'd: The branches are all joynted, ed, and have the ſame bore with the trunks, and are terminated with round and blunt joynts, but very ſmall. I find the bores or hollows of ſuch as are found to be commonly fill'd with a milky crudeled ſubſtance, which probably in their time of growth was fluid like that in Coral. As it cannot be doubted but many of theſe Plants grow on thoſe admirable *radix*'s of which we have given an account, and whereof I have at preſent ſome pieces which have a cinquefoil-bore on the top, others with the impreſſions of oval joynts there, and many other differences; ſo I am now fully ſatisfied that many of them grow from plain roots, that is, from plain *Spar*, or *Limeſtone*, without any ſuch figure, as the entire Plant does, and many other trunks which I have noted.

Another obſervable is, that theſe plants do not alwaies grow up with one trunk or body, but ſometimes five or ſix ſprouts, near of an equal bigneſs, ſhoot up together from the ſame root; as it uſually happens with Coral. As in my laſt I acquainted you, that I had ſome ſingle joynts and pieces of many joynts, which had ſix inlets in their hollows; ſo I have ſince met with ſome which have only four; others with ſeven, and doubtleſs there are of other varieties in this kind. Mr. *Liſter* is pretty full in his account concerning their outward differences; to which I may add, that ſome trunks have a circular edge on every other joynt; the intermittent joynt being ſmooth without edge or knot: Some Trunks have circular edges on the middle of every joynt, but ſo that the firſt and fifth edges are the higheſt; the ſecond and fourth the loweſt; the third is higher than the latter, and lower than the former; the joynts themſelves being great and ſmall accordingly, and this order holds all along the Plant. Some Trunks have edges according to the ſame order, only the edges on the ſecond and fourth joynts are round and blunt, the other three being ſharp; ſome have edges after the ſame order, which are all round and blunt. There are ſome Trunks wrought after the ſame manner, only the firſt and fifth joynts have a circle of knots round them, the other three have edges: Some Trunks have no circles, nor knots, but are only a little ſcabrous like the plates which compoſe ſome Roots, of which Plates I have alſo now ſome of different figures from what has been obſerv'd hitherto. It may be a *Quære*, whether theſe differences in the bores and outward coats of theſe plants do argue them to be of different ſpecies, diverſity of figure being uſually a mark of a ſpecifical diſtinction; but ſince the texture of their ſubſtance appears to be wholly the ſame, and we find no qualities either by the ſmell or taſte which manifeſt any ſuch diverſity, it may, perhaps, be as hard to make them out to be diſtinct ſpecies, as to ſhew a ſpecifical difference betwixt ſeveral Snow-bloſſoms.

Conſidering the reaſon of that ſtrange and mangled diſorder which theſe plants uſually lie in, ſome of them appearing to have been depreſt in their infant growth, others to have been broken after they were come to their full conſiſtency, &c. I gather it to be this: Whilſt theſe plants were growing, the clay wherein they grew was ſoft as a Quag mire, theſe probably requiring ſuch a ſubſtance to ſupport their growth, as Coral does Sea-water: afterwards as they began to ſettle to a Stony conſiſtency, and as part of the clay became of a rocky nature, the whole maſs ſank from its firſt poſition, and the moiſture paſſing away made ſome concavities, waſhing down ſome broken pieces of thoſe ſtones with it; and lumps of clay and other ſtones, falling down through thoſe crannies, added to their confuſion, being very apt to be diſordered by the leaſt concuſſion, either whilſt they were in their firſt growth, or after they were become Spar, their joynts being very tenderly ſet together; and hence theſe Stones are generally found in *Leirey* places (as they call it) that is, *Cavernous*.

The beſt way to explicate their *Vegetation* will be, *firſt*, to repreſent the ſeveral ways of the growth of *Spar*, which (to paſs by the account from *Helvetia*, that Snow by long lying and continual froſts is hardned into Spar) I obſerve to be three: *Either* it takes a being from Steams alone; or from Steams coagulating either Dew as it falls on the ground, or Waters iſſuing from the joynts of Rocks underground; *or* it grows from Earths and Clays. We have an Inſtance of the *firſt* in many Grotto's, where ſome Spars, produc'd from Steams alone, hang from the roofs like Icicles; Lead-oar often growing in the ſame manner; and as this Spar grows downwards, ſo in many places from the ſides of it, there iſſue little Plants of Spar, which ſhoot upwards contrary to the growth of the other: Thus Spars grow from ſteams about the Baths at *Buda* in *Hungary*, according to the relation of Dr. *Browne*. An example of the *ſecond* is given in the *Tranſact. N.*83.*p.*4068. where 'tis ſaid, that at a certain place in *Italy*

Italy Cryſtals (which are a ſort of Spars) are produc'd in clear evenings by a coagulation of Dew falling on Nitrous ſteams. We have ſome of the like riſe on *Mendip-hills*, our Miners finding ſometimes in roads, where the earth is bare, triangular Cryſtals about two inches in length, and an inch over, not with ſharp angles, like the Triangular glaſs, but with round and blunt angles, and carried up round at the ends like a Coco-nut, none of theſe being ever found in digging: I have ſeen of the ſame ſort which were taken up in *Gloceſter-ſhire.* So again its commonly ſeen in Grotto's, that ſteams, coagulating waters iſſuing from the Joynts of the clifts, produce Spars of all colours. As to their *third* way of generation, to wit from Earths and Clays, becauſe I do not remember to have met in any Author with a ſatisfactory account thereof, I ſhall briefly relate to you what I have obſerv'd herein.

There are on *Mendip-hills*, and generally where Mines are, ſubterraneous Vaults or Grotto's, whereof *ſome*, which are pretty deep, and admit not air too freely, and have other conditions requir'd, are ſaid by our Miners to be quick, having often oar in them, and ſtill lively colour'd Earths, with ſome moiſture and lively Spars: *Others*, admitting air two or three ways, and having in them black and moiſt rocks, and dry and rotten ſhelly Stones, dark Earths, barren Sands, and the like, being ſaid to be dead. I have often ſearch'd both, and in ſome of the former, particularly in one of them, which is 35 fathom deep by a perpendicular Line (though the oblique deſcent of it makes it above 50 fathoms to thoſe that go into it,) I diſcover'd this proceſs of nature in the formation of Spar: There are in the bottom of this Grotto ſome beds of Clay, and others of a Liver-colour'd earth, which I take to be as good a *Bole* as any now in uſe; it is inſipid to the taſte, but ſmells well, eſpecially when dry'd; for, as it lies, it is moiſt and like paſte, made ſo partly by the diſtilling waters, and partly by a ſteam incumbent on the place raiſed from thoſe waters by the Mineral ferments. This Earth and Clay there ſhoots up every where in ſpires in all proportions in height, from the firſt buddings out of it, till it comes almoſt as high as a mans finger; the biggeſt of them being in thickneſs about an inch diameter: Theſe ſpires are all rul'd up with irregular ridges and furrows, and ſome ſooner, ſome later begin on the top to be congeal'd into Spar, and ſo, gathering a cruſt downward by degrees, are all at laſt turn'd into an abſolute white Spar, with ſome *Diaphaneity*. I diſcover'd the ſame Earth in ſome places there growing ſpherical, which whilſt it is Earth, it is ſtill ſticking to its bed; but afterwards, as it comes to be cruſted over, and at laſt to be turn'd into Spar like the other, it grows clear off from its root, as fruit falls from the tree when ripe. I have by me of theſe Spherical ſtones, from the bigneſs of an ordinary Bullet to that of a great Pins-head, ſome turning to Spar ſooner than others: I found ſome quite grown off, ſome half grown, ſome white Spar outwardly, and raw Earth in the middle, ſo that the proceſs was as plain to me as I could wiſh. I ſaw the ſame Earth in ſome places there growing in an exact oval form, and turning into Spar not oval, but rais'd on both ſides with an edge round it like an Apricock-ſtone: And as theſe ſpherical and oval ſtones are moſt exact in their figure; ſo, notwithſtanding the Rector fails in this Vault to give a true ſexangular figure to thoſe which I ſaid ſhoot up pyramidally; yet there is a certain place on theſe hills, where the Spars grow all ſexangular, both points of them terminating into a pyramidal figure, ſexangular likewiſe, as the veins of Cryſtal, found in *Italy*, produc'd by a coagulation of Dew; theſe with us probably having the ſame riſe, lying alſo on the ſurface of the earth. Here I may acquaint you, that I find *Talc* on theſe Hills growing ſexangular; the ruſt, which often lies over veins of Lead-oar, in many places ſhoots up pyramidally, and is bounded round with ſix angles, and ſometimes with five: Lead-oar it ſelf often ſhoots up pyramidally with rough irregular lines round it, and in ſome places I find it bounded round very regularly with four angles; in other places it grows branched like a Plant, as I have ſeen in a Mine where the Stone-plants grow.

To come now to the *Vegetation* of theſe plants, I find, they begin their growth from the fineſt parts of clay, being commonly white, ſoft and ſmooth at firſt, and by degrees come to have ridges, knots and ſutures, as they grow towards a ſtony, and ſo to a ſparry nature. The pith continues ſtill ſoft and white, as the whole is at firſt, and its continually refreſht by the Mineral ſteams, and moiſture, which have free acceſs to it through the five hollow ſtirts or feet in the figur'd roots, or through the maſs of clay which commonly lies under the plain roots; this free ſupply of moiſture being probably more neceſſary for the ſupport of theſe plants than for thoſe which appear to the day; ſince Nature carries-on her Mineral generations with a ſtronger effort than other: Wherefore Field-plants hold a communion with the ſteams and moiſture of the earth by perſpiration only, as they breath through the roots, which have no open paſſage for them. Nor can it be ſaid but thoſe Stone-plants have true life and growth; for ſince in the curioſity of their make they may contend with the greateſt part of the Vegetable kingdom, having parts to aſſimilate nouriſhment by attraction, retention, concoction and expulſion, I know not why they may not be allow'd as proper a vegetation as any plant whatſoever. And indeed what has been ſaid hitherto againſt the vegetation of Stones, to prove that they receive their increaſe only by *juxta-poſition*, has been chiefly meant of Common ſtones, which have no parts that carry any analogy with plants; whereas theſe are ſhap'd like them, having inward pith or ſap, and likewiſe joynts, and runnings in their grit, and ſometimes cells, which may very well ſupply the place of veins and fibres. Nor does that argument which is brought in the *Tranſact. N.* 99. againſt the vegetation of Coral ſeem to convince us: For though that Perſon can produce a Salt of Coral, which after diſſolution will upon coagulation ſhoot into a little grove of Plants, as it were, reſembling the growth of Coral, this cannot diſprove its Vegetation; for, it's well known, that all Plants may be ſo prepar'd, that from their aſhes they will riſe again in their proper ſpecies after ſuch a manner.

As to that opinion which generally ſolves thoſe various *Phænomena* of the ſeveral figur'd Stones, which we find in Mines and elſewhere, by ſaying that they are parts of Plants and Animals, or whole ones, petrified; it ſeems not to be grounded on practical knowledge: Thus when we find ſeveral ſorts of *Shell-fiſh* in Mines, as there are ſome in the clay where thoſe Stone-plants grow, we muſt not flie to petrifaction, as though they had been brought there by the Sea, or otherwiſe, and ſo petrified; but we muſt take that to be (as it is truly) the natural place of their birth; ſome of them being raw-clay, others of the ſame texture with the Rock where they grow, and others of as abſolute a ſhelly ſubſtance as any in the Sea; theſe being only different gradations of Nature, which can as well produce ſhells in Mines as in the Sea, there being no want of Saline nor Earth-

ly

thy particles. Nor is there any great difference betwixt ſome ſorts of Spars, and Sea-ſhells; neither do I know, why Shells might not as well be produc'd in Mines, as any ſorts of Spars are in the Sea; for inſtance, the *Fungi Marini*, which are of a ſparry ſubſtance, ſome of them having their ſurface all wrought with flowers, as it were, which are only the terminations of ſparry cells, as in Coral, and Coral it ſelf is a ſort of Spar, which ſo well reſembles our Stone-plants in its growth, eſpecially if ſome of it be joynted, as Mr. *Ray* informs us, that I know not a more apt name for theſe than to call them *Mineral Coral*; unleſs ſome haply will rather ſay, they are *Fluores arboreſcentes internodiis diſtincti*; and as I find the bodies and branches of ſome Coral are all rul'd up with lines, ſo are many of theſe in ſome Mines, and are terminated with cells like it.

Mr. *Liſter* N.79. of the *Tranſact.* p. 2282. judges, that Shells found in Stone-quarries were never any part of an Animal; and gives this probable reaſon for it, becauſe Quarries of different ſtone yield us quite different ſpecies of Shells, not only one from another, but from any thing in Nature beſides, which either the land, ſalt, or freſh-water does yield; and though ſome ſeem of the ſame ſpecies, and much like each other, yet there is diſtinction enough to hinder them from being ſampled by any. *This Mr.* Liſter. I obſerv'd the ſame thing ſome years ſince, when I endeavour'd to ſatisfie my ſelf of the proceſs of Nature in this kind; and have now by me ſeveral ſpecies of Stones reſembling *Shell-fiſh*, which I gather'd from Plow'd fields and Quarries, that are ſcarce to be parallel'd, as I judge, by all the Collections of Sea-ſhells extant.

To examine this opinion of *Petrifaction* further; perhaps it might ſeem raſh to deny a petrifaction of Animals and Vegetables, ſo many inſtances being alledg'd on all hands by judicious perſons atteſting it; though I cannot ſay, that my own obſervations have ever yet preſented me with an ocular evidence of the thing: I only find, that the thing ſuppos'd to be petrified becoms firſt cruſted over with a ſtony concretion, and afterwards, as that rots away inwardly, the lapideſcent juyce inſinuates it ſelf by degrees into its room, and makes at laſt a firm ſtone reſembling the thing in ſhape; which may lead ſome to believe it really petrified. But, though a real petrifaction were allow'd in ſome caſes, it would not be rational to plead this in all the figur'd ſtones we ſee, in regard of thoſe many grounds we have for the contrary. But I take theſe to be the chief reaſons which make ſome ſo ready to embrace ſo generally this conceit of petrifaction, becauſe they are prepoſſeſt with an opinion againſt the vegetation of all Stones, and for that they think it impoſſible for Nature to expreſs the ſhapes of Plants and Animals where the Vegetative life is wanting, this being a faculty peculiarly belonging to that ſoul, whereas they ſeem to erre in both: For, as what has been ſaid concerning our Stone-plants, may ſuffice to prove their vegetation; ſo it will be as eaſie to ſhew, that Nature can and does work the ſhapes of Plants and Animals without the help of a Vegetative ſoul, at leaſt, as it is ſhut up in common ſeeds and organs. To be ſatisfi'd of this, let them view the figurations in *Snow*; let them view thoſe delicate Landskips which are very frequently (at leaſt in this Country) found depicted on ſtones, carrying the reſemblance of whole groves of Trees, Mountains and Vallies, &c; let them deſcend into Coal-mines, where generally with us the clifts near the Coal are all wrought with curious repreſentations of ſeveral ſorts of *herbs*; ſome exactly reſembling *Fern-branches*, and therefore by our Miners call'd the *Fern-branch clift*; ſome reſembling the leaves of *Sorrel*, and ſeveral ſtrange Herbs, which haply the known Vegetable kingdom cannot parallel; and though it could, here can be no colour for a petrifaction, it being only a ſuperficial delineation. The like may be ſaid of Animals, which are often found depicted on Stones; as all Mineral hiſtories will ſufficiently inform them. Now ſince here is no place for Petrifaction, or a Vegetative ſoul, we can only ſay, that here is that ſeminal root (though hindred by the unaptneſs of the place to proceed to give theſe things a principle of life in themſelves) which in the firſt generation of things made all Plants, and, I may ſay, Animals riſe up in their diſtinct ſpecies; God commanding the Earth and Waters to produce both, as ſome Plants and Animals riſe up ſtill in certain places without any common ſeed.

It ſeems to be a thing of a very difficult ſearch, to find what this *Seminal root* is, which is the efficient cauſe of theſe figures. Many of the Ancients thought it to be ſome outward mover which wrought the figures in things for ſome end; the *Peripateticks* rather judg'd it to be ſome vertue implanted in the ſeeds, and in ſubſtances having an analogous nature with the ſeed.

I have now and then eſſay'd to find the nature of this Efficient, which works theſe figures in ſtones: It ſeem'd to me not very unapt to explicate it according to the ſaying of *Heraclitus* ; *Lux ſicca, anima ſapientiſſima*, that is, where there is a ſtrong internal light to expand the Idea's, and a drought to terminate them, the vertue of a ſoul is ſtill preſent which imprints them in the matter : Hence we find Nature is moſt buſie in the kind where her intentions are highly raiſed by the preſence of her chief principles, Salts, Sulphurs, and Mercuries promoting her ferments, which cauſe ſome internal light and drought, the *Ignes fatui* being only ſhadowy reſults from them : Thus we ſee over and in beds of Clays and Marles, which have ſtrong ferments, being well impregnated with Salts, there often lie beds of Marchaſites full of luminous particles, and there we frequently find great numbers of *Lapides Serpentarii*, and Marchaſites reſembling Snakes ; and ſo ſeveral other figur'd Stones, as the *Belemnites*, &c. In the joynts of the Lias-ſtones, growing over beds of Clay, we often meet with a great plenty of elegant Landskips. In Coal-mines, where the Sulphurs are ſtrong, we find great lumps of very bright Marchaſites, and great varieties of Herbs depicted, as is ſaid before. In Mines of Metals, where the Mercuries are generally predominant, there are landskips and repreſentations both of Land and Sea-animals, whereof ſome carry a bulk, others are only ſuperficially delineated. Thoſe who endeavour to explicate thoſe figurations mechanically, ſeem to have a harder task ; for, if they ſay with *Hippocrates*, l. *de Nat. Pueri* ; *Spiritu diſtenta omnia pro generis affinitate diſtant* ; as though, when the Mineral ſpirit had extended the matter, it fell into thoſe figures upon a ſpontaneous receſs according to its proper weight, which gives order and meaſure to things ; as he mechanically ſhews by a Bladder, into which if earth, ſand, and filings of lead be put, and water be added to them, and we give them motion by blowing in the Bladder through a reed, firſt they are mixt together with the water, but in a while continuing in a gentle motion they ſeparate themſelves and retire each to its like, the lead to the lead &c ; I ſay, if it be explicated thus, it ſeems difficult to conceive, how the matter ſhould come to have ſuch a determinate weight to run into ſuch figures, without a ſpecifical *Rector* to intend and diſpoſe it, unleſs a general one be admitted, in whoſe vertue all known and poſſible ſpecies are, which, firſt introducing diſpoſitions in the matter, he intentionally works; and, as ſometimes he gives that weight to the matter, not endowing it with a principle of life, ſo he often diſpoſes it to receive life and introduces it: which Poſition I conceive will hold good, notwithſtanding ſome late induſtrious eſſays to prove that there is no Equivocal birth.

Thus, *Sir*, I have inform'd you, that the *Trochites* are parts of Rock-plants, and have given you ſomething of what I conceive and practically know concerning their vegetation, eſſaying withal to render ſome account of thoſe various figures which are found amongſt Minerals: Not but my thoughts are very poor of theſe things, which can make but a very ſlender addition to that rich ſtore ſent you by your learned Correſpondents. I ſhall conclude with a requeſt to you concerning a thing, which may prove very much to the advantage of thoſe who are concern'd in Mineral adventures: It is a conſtant opinion amongſt our Miners, that *Lead-oar* diſcovers it ſelf by an Oily-ſmell, and that chiefly in a morning a little before the riſing of the Sun, eſpecially when ſome ſhow'rs have fall'n in the night: This being ſo, I find two things in the *Tranſact.* which give me hopes that this way of diſcovery may be much improv'd by Art: The *firſt* is an intimation of a way ſhewn by Sr. *William Petty* in his Tract of *Double proportions*, whereby we may diſcover a ſmell at a great diſtance, and ſo conſequently the intenſneſs and remiſneſs of it near at hand, wherein the chief difficulty will conſiſt; for, where theſe Smells riſe, they commonly diffuſe themſelves to a furlongs circumference or more, ſo that we are more at a loſs to find exactly the place whence they riſe, than to make a firſt diſcovery of them. The ſecond thing is the *Statical Baroſcope* of Mr. *Boyle*, which I conceive may give us ſome light of their true ſource, there being probably at that place a conſiderable variation in the preſſure of the Atmoſphere by reaſon of the Mineral-ſteams which are there in the greateſt abundance. I am not ignorant, that ſome ſtrongly fermented beds of Mineral-earths and ruſts, which are ſometimes barren, ſend forth a ranker ſmell than Oar it-ſelf, which may now and then deceive us; but becauſe for the moſt part theſe are concomitants of Oar, we may not look upon the attempt as fruitleſs. Now, *Sir*, my humble requeſt to you is, that you will be pleaſed to oblige me with your opinion of the probability of the ſucceſs, and to inſtruct me in the way which Sr.

William Petty propoſes in his *Double proportions*; for I have not read the Tract;and if I underſtand you judge the thing rational, I ſhall endeavour to procure the Inſtruments, and proceed to practice, and ſhall pay you my hearty thanks with a ready return of any ſervice that lies in me, being, *Sir*,

Stony-Eaſton, June 17. 1676.

Your obliged and humble Servant, J.Beaumont *Jun.*

An Account of ſome Books:

I. *Ephemeridum Medico-phyſicarum Germanicarum ANNUS* IV *&* V, *Anni* 1673 *&* 1674,*&c. Cum Appendice*: Francofurti *&* Lipſiæ, 1676. *in quarto.*

THis induſtrious Collection contains 210 Obſervations; among which not a few ſeem conſiderable and uncommon; *E.g. Menſes* coming at 8 and 9 years of age: A Prince that lived a great while with great and dangerous diſeaſes: The Errors of Nature in one part,ſupplied by another: A preſervation from drunkenneſs by the gaping of a Suture of the Head: A cure of the Scurvy by a Dog's licking the Patient in the parts moſt affected,together with the cure of that Dog, becoming altogether ſcabby,by *Mercurius dulcis*:Two men monthly troubled with the Hæmorrhoids,from their youth, the one unto the eightieth, the other to the ninetieth year of his age: An Ague recurring every eighth day: Worms of divers ſorts fallen down with Snow in *Hungary*,not far from the Copper-mines of that Country: Of a young woman, that though ſhe did for a while drink wine, yet came afterwards ſo to abhor it, that ſhe could take nothing phyſical, that had any thing prepared of Tartar in it,but did ſweat,and faint away when it was given her,though ſhe knew nothing of it before hand: The juyce of Hemlock mixed only with a little Sugar,for ſeveral days taken inwardly, to the quantity of three ounces at a time, to allay the heat of the Liver; follow'd by no other noxious effect but a debilitation of the ſtrength of the Patient: The Preparation of the Helmontian *ludus*, together with an account, that the Oil, drawn of black Flints,ſuch as we ſtrike fire with, cures the Stone of the Bladder; as alſo, that the Spirit of Sea-ſalt, eſpecially of *Spaniſh*-ſalt, is a potent remedy againſt the Strangury: A wound in the Breaſt and Lungs not mortal: Fontinels or Iſſues naturally ariſing in the Arms and Feet,and curing a Patient of a violent Head-ache,and troubleſom puſtules of the Head; as alſo of an Iſſue in the